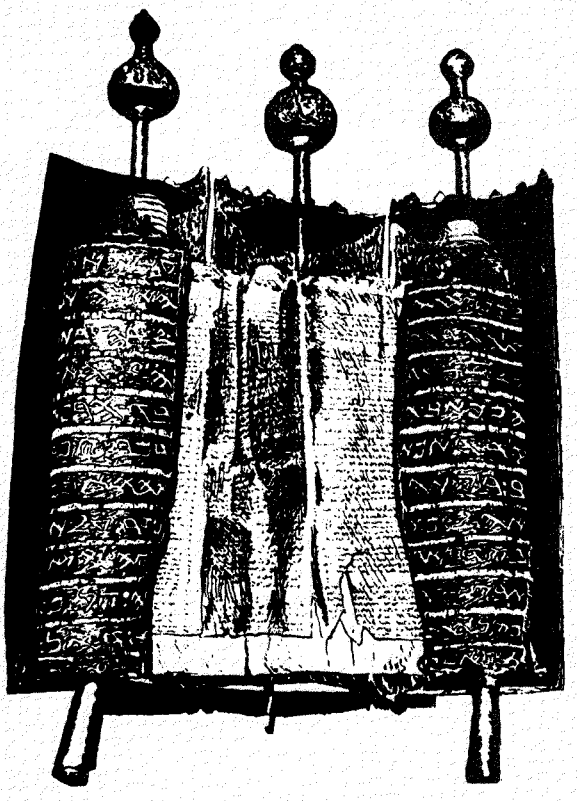
Creation / Evolution



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About this issue . . .

Issue XI was devoted entirely to exposing the difficulties in creationist attempts to render scientifically plausible the story of Noah's Ark. It proved to be the most popular issue we have published, and many of the written comments will be printed in our next issue. But debunking the efforts of pseudo-scientific biblical literalists by pitting their claims against the facts of nature is only one way to reveal the bankruptcy of their case. Another, and perhaps more basic, approach is to challenge their biblical literalism itself. Do "scientific creationists" read the Bible correctly? Is their biblical scholarship credible, or is it as outdated and superficial as their science?

In this issue, Conrad Hyers demonstrates how the matters dealt with in Genesis have nothing to do with the current creation-evolution controversy. The great religious issue that the biblical writers sought to resolve was one of a very different sort—one that proved to be more basic to modern Western religious belief than creationists suspect.

In future issues of *Creation/Evolution*, we will feature articles discussing Genesis from further angles. Although we remain a journal that focuses upon the scientific errors creationists make, it is important that we not miss the fact that they make errors in biblical scholarship as well—lest some accept the creationist claim that one must choose between evolution and the Bible.

In the matter of choosing, J. B. Gough shows in this issue that the whole creationist notion that there are only two "models"—the "creation model" and the "evolution model"—is philosophically indefensible.

And then there is another matter. Are creationists really catastrophists? Robert Schadewald shows why the answer is *no*.

From what you learn in this issue, it should become apparent that creationists err in more areas than science.

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Genesis Knows Nothing of Scientific Creationism

Interpreting and Misinterpreting The Biblical Texts

Conrad Hyers

It has been said of the Holy Roman Empire that it was neither holy nor Roman nor an empire. Something similar could be said of "scientific creationism" or "Bible science." It is neither good science nor good Bible, but a confusion of both. Creationism attempts to do a biblical reading of scientific and historical data and a scientific and historical reading of biblical data. Neither of these crossovers is appropriate or workable. They are true neither to science nor to the Bible, even though they claim to offer the only true science and true biblical teaching. The result is a labyrinthian tangle that requires considerable energy and patience to unravel.

To suggest that the first chapters of Genesis ought to be viewed as an alternative to evolutionary theories presupposes that these chapters are yielding something comparable to scientific theories and historical reconstructions of empirical data. Interpreting the Genesis accounts faithfully, and believing in their reliability and authority, is presumed to mean taking them literally as history, as chronology, as scientific truth. The Creation Research Society requires its membership to sign a statement of belief which begins:

> The Bible is the written Word of God, and because we believe it to be inspired thruout [*sic*], all of its assertions are scientifically true in all of the original autographs. To the student of nature, this means that the account of origins in Genesis is a factual presentation of simple historical truths. (*Creation Research Society Quarterly*)

When one carefully examines the argument, however, one discovers that the biblical understanding of creation is not being pitted against evolutionary theories, as is supposed. Rather, evolutionary theories are being juxtaposed with literalist theories of biblical interpretation. This is not even like compar-

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ing oranges and apples; it is more like trying to compare oranges and orangutans. Even if evolution is only a scientific theory of interpretation posing as scientific fact, as the creationists argue, creationism is only a religious theory of biblical interpretation posing as biblical fact. And to compound the confusions, these biblical "facts" are then treated as belonging to the same level of discourse and family of concerns as scientific facts and therefore supportable by scientific data, properly interpreted.

Quasi-Science and Quasi-Religion

Most analysts outside the movement would readily concur that Creation Science is not genuine science but a deceptive facsimile which easily misleads people who have only a lay knowledge of science. It is not a science inasmuch as the organization of data and the conclusions are already present from the start, and are absolute and inviolable. No contrary arguments or information can be entertained or admitted, on the grounds that the scientific and historical truth of the matter has already been vouchsafed by divine revelation. There is therefore no possibility for free and unfettered inquiry, moving wherever the evidence seems to lead no matter how many cherished beliefs and time-hallowed opinions may have to be modified or abandoned.

A leading creationist, Henry Morris, states: "It is only in the Bible that we can possibly obtain any information about the methods of creation, the order of creation, the duration of creation, or any of the other details of creation" (Morris, p. 16). What scientific investigation there is, under these dogmatic assumptions, is devoted to finding evidence to fit this "creation model," and to discrediting all evidence that does not corroborate it. In the event that this is not sufficiently persuasive, name-calling, innuendo, and guilt-by-association are resorted to:

> Belief in evolution is a necessary component of atheism, pantheism, and all other systems that reject the sovereign authority of an omnipotent personal God. [It] has historically been used by their leaders to justify a long succession of evil systems—including fascism, communism, anarchism, Nazism, occultism, and many others. [It] leads normally to selfishness, aggressiveness, and fighting between groups, as well as animalistic attitudes and behavior by individuals (Morris, p. vii).

Such so-called science is not scientific either in spirit or in form. Its presuppositions, motives, methods, attitudes, reasonings, and results are a gross caricature of science. Preston Cloud has noted: "Fundamentalist creationism is not a science but a form of antiscience, whose more vocal practitioners, despite their master's and doctoral degrees in the sciences, play fast and loose with the facts of geology and biology" (p. 15).

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While such distortions of science and their effects on public education are in need of careful scrutiny, the other side of creation science is equally a caricature, namely its claim to represent the true understanding of the biblical texts of creation and their theological meaning. Of the two distortions, the religious misrepresentation is at least as critical as the scientific, if not more so. In a sense, it is *more* critical inasmuch as the motivations for creationism are basically religious, not scientific. The problem has arisen, in the first place, because of certain fundamental misunderstandings of the biblical texts, which then lead to distortions of science in an effort to bring it into conformity with the literalist belief system. Only when the religious misunderstandings are clarified is there a possibility of resolving the problem.

Despite the efforts of some creationists to soft-pedal the religious character of the "creationist model" in order to get their textbooks adopted and their position given "equal time" in public education, such a subterfuge hardly veils the religious character of the position. How can one have a Creation without a Creator? If creationism is fundamentally a religious position rather than a scientific one, it must finally be examined and critiqued on religious grounds. No matter how many creationist arguments are shown to be fallacious, and no matter how much evolutionary data is marshalled against the position, inasmuch as the ultimate commitment is to a particular interpretation of religious texts, scientific evidence can never be fully convincing. So long as the literalist theory of interpreting Genesis materials remains the cornerstone of creationism, no amount of scientific information, however otherwise overwhelming, will be permitted to cast doubt on the literalist credo.

Creationist attempts at refuting mounting evidence from many scientific fields in support of evolutionary theory and at marshalling their own evidence in support of creationism are reminiscent of tobacco company scientists arguing that no direct correlations between smoking and lung cancer have been decisively proven. One suspects that motives other than a quest for truth and impartiality are involved. In this case the motives are undoubtedly religious, even if, as will be shown, mistakenly and misguidedly so. When someone is determined enough to defend a particular position against all comers, however tenuous it might be, the impossibility of absolute scientific proof always leaves the door open a crack for various and sundry positions to slip in and out. Exceptionally determined people, it seems, like the Queen in *Alice in Wonderland*, are capable of believing as many as three impossible things before breakfast!

Approaching the Biblical Texts

The Biblical record, accepted in its natural and literal sense, gives the only

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> scientific and satisfying account of the origins of things. . . . The creation account is clear, definite, sequential, and matter-of-fact, giving every appearance of straightforward historical narrative" (Morris, pp. iv, 84).

Quite apart from any scientific and historical objections that may be advanced against such a statement, there is not a single word of truth in it, biblically or theologically. As long as creationism maintains an ultimate allegiance to such an interpretive approach to biblical materials and religious doctrines, every effort will be made to shift doubt away from its own assumptions—where doubt properly belongs—and onto evolutionary science. The creationist tactic is two-fold: to equate doubts about literalism with doubts about the Bible and its religious teachings; and to divert all doubt in the direction of scientific assumptions, scientific evidence, the scientific method, scientific motives, scientific conclusions, the presumed consequences of science, and scientists themselves.

But these literalist assumptions are precisely what are in question. It is by no means self-evident that the biblical texts upon which creationism bases its case are a "record," or that they give "every appearance of straightforward historical narrative," or that their "natural" sense is the "literal sense," or that this sense is "scientific" or "matter-of-fact." Nor is it self-evident that the Genesis authors are attempting to provide "information," and that this supposed information is "about the methods of creation, the order of creation, the duration of creation, or any of the other details of creation." Quite the contrary. These are assumptions—indeed demands—that have been brought to the text, confused with the text, given the authority of the text, and absolutized along with the text, requiring the same allegiance as to the text itself. Such an absolutizing of assumptions is neither in the spirit of science nor the Bible. In science it is called dogmatism; in the Bible, idolatry.

This may be the way the creation texts *appear* to certain modern interpreters at considerable remove from the religious context in which the texts were written and imbued with a consciousness so heavily influenced by science and historiography. And this may be the way these texts have always appeared to an unreflective popular level of religion. But it is by no means obvious that this represents the original intent, religious concern, or literary form of the Genesis materials. This is the fundamental interpretive issue. And it cannot be settled by dogmatic assertions about the Bible nor by scientific and historical evidence concerning the natural order but only by careful examination of the texts themselves and the contexts in which, and to which, they were written.

When this is done, the Genesis accounts of creation do not prove to be in conflict with scientific or historical knowledge. This is not because the creation texts can be shown to be in conformity with the latest scientific and historical knowledge, or supported by it, but precisely because they have

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little to do with it. They belong to radically different types of literature, with equally different types of concerns and goals.

Let's take an example from poetry, with which Genesis has more affinities than with scientific or historical prose. A poetic treatment of an autumn sunset is neither scientifically true nor untrue. It needs no harmonization with scientific statements and requires no scientific confirmation. It is simply unrelated to that sort of truth and that type of concern. A poem deals with poetic truth and poetic concerns. For someone to try to defend a particular poem by attempting to argue that it was scientifically and historically correct in every respect would be no defense at all. It would be a confusion of categories, like trying to defend a client being sued for divorce in a traffic court. In literature this would be called a mixing of genres. Any defense of a poem based on such confusions, and any attack on other forms of literature which do not "agree" with the poem, no matter how well-meaning and heroic, would be the greatest possible disservice to the poem, the spirit of the words, the intentions of the poet, and the nature of poetry.

Similarly, a literal interpretation of the Genesis accounts of creation is inappropriate, misleading, and unworkable. It presupposes a kind of literature and concern that is not there. In doing so it misses the symbolic richness of what *is* there and subjects the biblical materials, and the theology of creation, to a completely pointless and futile controversy. The "creation model" of origins is not what the texts are about. So the issue, ultimately, is not that creationism is scientifically and historically incorrect, but *biblically* incorrect.

Monotheism Versus Polytheism

There are actually two accounts of creation, one following the other, in Genesis 1 and 2. The first is commonly referred to as the Priestly account, because it reflects a priestly style, and priestly context and concern. It was probably written in the sixth century B.C. during, or shortly after, the Babylonian captivity. The Priestly account uses the schema of six days of creation and occupies the first chapter and first verses of the second. The other account, to which this has been prefaced, begins in chapter two, verse 4b, and contains the story of Adam and Eve in Eden. It is referred to as the Yahwist account because of its use of the term *Yahweh* (Jehovah) for God, and was probably written in the time of Solomon (tenth century B.C.). Since it is the Priestly account that is central to the "creation model," the preponderance of attention will be given to the problem of its interpretation.

The alternative to the Priestly account available at the time was obviously not some prominent theory of evolution. All cultures surrounding Israel had their origin myths, some impressively developed in epic proportions and

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covering most every aspect of the cosmos in great detail. Yet they were, from the standpoint of Jewish monotheism, hopelessly polytheistic. The one origin account within Israel, the Yahwist, was monotheistic. But it did not have the sweeping cosmic scope of other cosmologies. This was especially critical relative to Canaanite religion within Palestine, with its Baal myth and cult, and to the religion of the Assyrians and Babylonians who in succession had conquered Israel and were the proud possessors of grand cosmologies, as well as complex astrological systems.

In fact, if one looks at the cosmological alternatives that were prominent in the ancient world, one senses immediately that the current debate over creation and evolution would have seemed very strange, if not unintelligible, to the writers and readers of Genesis. Scientific and historical issues in their modern secular form were not issues in debate at all. Science and natural history as we know them simply did not exist, even though they owe a debt to the positive value given to the natural order by the biblical monotheistic affirmation of creation, which emptied nature of its many resident divinities.

What very much existed and what pressed on Jewish faith from all sides—and even from within—were the religious problems of idolatry and syncretism. The critical question in the creation account of Genesis 1 was polytheism versus monotheism. That was the burning issue of the day, not some issue which certain Americans 2,500 years later in the midst of a scientific age might imagine that it was. And one of the reasons for its being such a burning issue was that Jewish monotheism was such a unique and hard-won faith. The temptations of idolatry and syncretism were everywhere. Every nation surrounding Israel, both great and small, was polytheistic. And many Jews themselves held—as they always had held—similar inclinations. Hence the frequent prophetic diatribes against altars in high places, the Canaanite cult of Baal, and "whoring after other gods."

Read through the eyes of the people who wrote it, Genesis I would seem very different from the way most people today would tend to read it—including both evolutionists who may dismiss it as a prescientific account of origins and creationists who may try to defend it as the true science and literal history of origins. For most peoples in the ancient world the various regions of nature were divine. Sun, moon, and stars were *gods*. There were sky gods, earth gods, and water gods. There were gods of light and darkness, rivers and vegetation, animals and fertility. Everywhere the ancients turned there were divinities to be taken into account, petitioned, appeased, pacified, solicited, avoided. For ancient Jewish faith, this divinized nature posed a fundamental religious problem.

In addition, pharaohs, kings, and heroes were often seen as sons of gods, or at least as special mediators between the divine and human spheres. The greatness and vaunted power and glory of the successive waves of empires

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that impinged on or conquered Israel (Egypt, Assyria, Babylon, Persia) posed an analogous problem of idolatry in the human sphere.

In the light of this historical context it becomes clearer what Genesis 1 is undertaking and accomplishing: a radical and sweeping affirmation of monotheism vis-a-vis polytheism, syncretism, and idolatry. Each day of creation tackles two principal categories of divinity in the pantheons of the day and declares that these are not gods at all, but creations of the one true God who is the only one, without a second or third. Each day dismisses an additional cluster of deities, arranged in a cosmological and symmetrical order.

On the first day the gods of light and darkness are dismissed. On the second day, the gods of sky and sea. On the third day, earth gods and gods of vegetation. On the fourth day, sun, moon, and star gods. The fifth and sixth days take away any associations with divinity from the animal kingdom. And finally human existence, too, is emptied of any intrinsic divinity—while at the same time *all* human beings, from the greatest to the least (not just pharaohs, kings, and heroes) are granted a divine likeness and mediation.

On each day of creation another set of idols is smashed. These, O Israel, are no gods at all—even the great gods and rulers of conquering superpowers. They are the creations of that transcendent One who is not to be confused with any piece of the furniture of the universe of creaturely habitation. The creation is good, it is very good, but it is not divine.

We are then given a further clue concerning the polemical design of the passage when the final verse (2:4a) concludes: "These are the generations of the heavens and the earth when they were created." Why the word *generations*, especially if what is being offered is a chronology of days of creation? Now to polytheist and monotheist alike the word *generations* at this point would immediately call one thing to mind. If we should ask how these various divinities were related to one another in the pantheons of the day, the most common answer would be that they were related as members of a family tree. We would be given a genealogy, as in Hesiod's *Theogony*, where the great tangle of Greek gods and goddesses were sorted out by generations. Ouranos begat Kronos; Kronos begat Zeus.

The Egyptians, Assyrians, and Babylonians all had their "generations of the gods." Thus the Priestly account, which had begun with the majestic words, "In the beginning God created the heavens and the earth," now concludes—over against all the impressive and colorful pantheons with their divine pedigrees—"*These* are the generations of the heavens and the earth when they were *created*." It was a final pun on the concept of the divine family tree.

Other cosmologies operated, essentially, on an analogy with *procreation*. A cosmic egg is produced and hatches. A cosmic womb gives birth. Or a god and goddess mate and beget further gods and goddesses. In the priestly account a radical shift has taken place from the imagery of procreation to

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that of *creation*, from a geneology of the gods to a genesis of nature. When Hesiod entitled his monumental effort at systematizing the complicated web of relationships between the many Greek gods and goddesses a *theogony*, he was reflecting the fundamental character of such cosmologies. They are theogonies (birth of the gods) and theo-biographies as well. They depict the origin, life, and times of the various divinities. And they interpret "nature" in terms of these divine relationships. Procreative, family, social, and political relationships are used to describe the natural order, understood as divine beings and powers. Thus, if there is any sense in which the "creation model" of Genesis stands over against evolutionary models of natural and human history, it is in the sense that it self-consciously and decisively rejects any evolution of cosmic forces presented in terms of an evolution of the gods. For that, by and large, was what polytheistic cosmologies were: the evolution of natural phenomena read as the emergence of new species of divinity. And their interaction with one another, their ecology, was read as the interaction within and between various families, clans, and armies of gods.

The fundamental question at stake, then, could not have been the scientific question of how things achieved their present form and by what processes nor even the historical question about time periods and chronological order. The issue was idolatry, not science; syncretism, not natural history; theology, not chronology; affirmation of faith in one transcendent God, not empirical or speculative theories of origin. Attempting to be loyal to the Bible by turning the creation accounts into a kind of science or history is like trying to be loyal to the teachings of Jesus by arguing that his parables are actual historical events and only reliable and trustworthy when taken literally as such.

Even among interpreters who do not identify with the literalism of the creationists, one often finds a sense of relief expressed in noting that the sequence of days in Genesis 1 is relatively "modern," and offers a rough approximation to contemporary reconstructions of the evolution of matter and life. Actually, however, its closest approximation in this regard is to the Babylonian "Genesis," the *Enuma elish*. This epic mythology exalts Marduk, the patron deity of Babylon, as the supreme divinity in the Mesopotamian pantheon. Marduk is extolled for rescuing the cosmos from the threat of the goddess of the watery abyss, Tiamat, out of whose womb the first gods had come. He then established, out of the two halves of the slain Tiamat, heaven and earth; sun, moon, and stars; vegetation; animals and fish; human beings. It is this order, and this cosmology, that Genesis 1 most directly approximates. It provides a Jewish cosmology to preface the story of Adam and Eve, on a scale equally encompassing to that of other ancient Near Eastern cosmologies, yet without the polytheistic mythological dramatics.

The attempt, then, to harmonize Genesis with modern science by reading the days of creation as referring to large epochs of time, rather than literal

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days, is no more relevant to the issues the Priestly writer was addressing than the literalist interpretation. At best the days, read as epochs, provide a *very* rough approximation to recent scientific scenarios. The entire progression actually begins, not with a burst of light, but with watery chaos—as in the Babylonian epic—which hardly corresponds to any modern understanding of origins. The "formless earth" is also depicted as existing before the light of day one and the sun, moon, and stars of day four. Vegetation is created before the sun, moon, and stars, on the third day, and surely would have wilted awaiting the next epoch.

Still, no matter how close the approximations to modern natural histories might be, the entire line of argument is a lapse into a form of literalism, with its assumption that this account is in some way comparable to a scientific, historical one. If there is a "modern" appearance to the account, it is not because it anticipates modern scientific constructions by presenting a similar sketch of a scientific order but because it anticipates them by preparing the way *for* them, in purging the cosmic order of all gods and goddesses. In Genesis the natural order, for the first time, becomes natural rather than supernatural. Nature has been demythologized and de-divinized. What was formerly divine, or a divine region, is now declared to be "creature." Nature, in fact, could not become nature in the sense in which we have come to use the term until it was emptied of divinity by monotheistic faith. Nor could science and natural history become possibilities until nature was thoroughly demythologized. One may have half-way houses, such as astrology and alchemy, but only when nature is no longer a divine sphere can it be probed and studied and organized without fear of trespass or reprisal.

This does not mean that Genesis secularizes or desacrilizes nature; nature is still sacred by virtue of having been created by God, declared to be good, and placed under ultimate divine sovereignty. What it *does* mean is that Genesis 1 clears the cosmic stage of its mythical scenes and polytheistic dramas, making way for different scenes and dramas, both monotheistic and naturalistic.

Numbering and Numerology

A related area of confusion is the supposition that the numbering of days is to be understood in an arithmetical sense, whether as literal days or as epochs. This is certainly the way in which numbers are used in science, history, and mathematics—indeed, in almost all areas of modern life. But the use of numbers in ancient religious texts was often numerological rather than numerical. That is, their symbolic value, not their secular value as counters, was the basis and purpose for their use. The conversion of numerology to arithmetic was

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essential for the rise of modern science, historiography, and mathematics. Numbers had to be neutralized, secularized, and completely stripped of any symbolic suggestion in order to be utilized. The principal surviving exception to this is the negative symbolism attached to the number 13, which still holds a strange power over Fridays, and over the listing of floors in hotels and high rises.

The creationists, in their literal treatment of the six days of creation, are substituting a modern, arithmetical reading for the original symbolic one. They are therefore offering, unwittingly, a secular rather than religious interpretation. And in the process, they lose the symbolic associations and meanings of the text while needlessly placing it in conflict with scientific and historical readings of origins.

One of the religious considerations involved in numbering is to make certain that any schema used works out numerologically—that it uses, and adds up to, the right numbers symbolically. An obvious concern of the Priestly account is to correlate the theme of the divine work in creation with the six days of work and seventh day of rest in the Jewish week. If the Hebrews had had a five-day or seven-day work week, the account would have read differently. Seven was a basic unit of time among West Semitic peoples, and the Sabbath-day was well defined and established by this period. It was important, then, to use a schema of seven days, and to have the work of creation completed on the sixth day. "And God ceased on the seventh day from all the work which he had done" (Genesis 2:2). The word "ceases" is *shabat*, a cognate of the term *shabbat*, sabbath. The "creation model" being used here is in no sense a scientific model, but a liturgical-calendrical model based on the Jewish week and observance of sabbath. Its motivation is religious, not scientific: to give ultimate grounding to the meaning of human work and creation, and to the religious significance of the sabbath observance.

The seven-day structure is also being used for another, not unrelated, reason. The number 7 has the numerological meaning of wholeness, plenitude, completeness. This symbolism is derived, in part, from the combination of the three major zones of the cosmos as seen *vertically* (heaven, earth, underworld) and the four quarters and directions of the cosmos as seen *horizontally*. Both the numbers 3 and 4 in themselves often function as symbols of totality, for these and other reasons. But what would be more "total" would be to combine the vertical and horizontal planes. Thus the number 7 (adding 3 and 4) and the number 12 (multiplying them) are recurrent biblical symbols of fullness and perfection: 7 golden candlesticks, 7 spirits, 7 words of praise, 7 churches, the 7th year, the 49th year, the 70 elders, forgiveness 70 times 7, and so forth.

When Joshua's army took the city of Jericho, they are said to have

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circumambulated the walls once a day for the first 6 days, and 7 times on the 7th day, preceded by 7 priests blowing 7 trumpets; whereupon the walls collapsed and the city was completely taken. Even Leviathan, the dread dragon of the abyss, was represented in Canaanite myth as having 7 heads—the "complete" monster.

The symbolic meaning of the number 7, and of the 7 days, also harks back to the lunar calendar which, in Mesopotamia, had quite early been divided into 4 phases of the moon, of 7 days each, followed (beginning with the 28th day) by the 3-day disappearance of the moon—thus equally 30 days. The Babylonian epic of creation, *Enuma elish*—which itself consists of 7 tablets—has the god Marduk appointing the moon to four 7-day periods: "Thou shalt have luminous horns to signify six days, on the seventh day reaching a half-crown" (Pritchard, p. 68). On the seventh day of these lunar weeks one was counselled to abstain from a variety of ordinary activities because of the dangers involved during the critical transitions of the lunar progression. According to one ritual text, seers were not to give oracles, physicians to administer to the sick, or the king to change clothing, ride in a chariot, hold court, eat cooked meat, or offer sacrifices (Barton, p. 258 f.). The day of the full moon was known as *shapattu*, which has a probable relation to the Hebrew term for sabbath, *shabbat*, and *shabat*, "stop working." This day is referred to in the Mesopotamian cunieform texts as the "day of the quieting of the heart."

In the Hebrew tradition the seventh day, while associated with cessation of normal activity, is separated from the lunar week and looked upon more positively as a day of blessing, celebration, and rest. "The Lord blessed the sabbath day and hallowed it" (Exodus 20:11). This day does not suggest an atmosphere of anxiety or transition, but of relaxation and completion. Such positive meanings are now being applied by the author of Genesis 1 to a celebration of the whole of creation and of the parenthesis of sabbath rest. The liturgically repeated phrase "And God saw that it was good," which appears after each day of creation, and the final capping phrase "And behold it was very good," are paralleled and underlined by being placed in a structure that is climaxed by a seventh day.

The Priestly account also makes use of the symbolism of the corresponding number for wholeness and totality: 12. The six days of creation are actually two sets of three days each, with two types of phenomena assigned to each day. The second set of days fills in the details provided by the backdrop of the first set of days. The light and darkness of day one are populated by the greater and lesser lights of day four; the firmament and waters of day two are populated by the birds and fish of day five; and the earth and vegetation of day three are populated by the land animals and humans of day six. In this manner all the major regions of the cosmos are covered in six days, with

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two zones included each day, equalling 12. Thus the symbolism of completion and fulfillment is associated with the *work* of creation as well as the rest from it on the seventh day. The totality of nature is created by God, is good, and is to be celebrated both daily and in special acts of worship and praise on the sabbath day.

Uses of the numerology of 12, like 7, abound throughout the Bible: the 12 tribes of Israel, as well as the 12 tribes of Ishmael, the 12 districts of Solomon, and Jesus' selection of 12 disciples, along with a miscellany of references to 12 pillars, 12 springs, 12 precious stones, 12 gates, 12 fruits, 12 pearls, and so forth. We, of course, continue the biblical and ancient Near Eastern division of the day and night into 12 hours and the year into 12 months. And the grouping of stars into 12 constellations and signs of the zodiac into 12 periods also derives from ancient Mesopotamia, along with the belief that the body was composed of 12 parts or regions.

Though in the modern world numbers have become almost completely secularized, in antiquity they could function as significant vehicles of meaning and power. It was important to associate the right numbers with one's life and activity and to avoid the wrong numbers. To do so was to surround and fill one's existence with the positive meanings and powers which numbers such as 3, 4, 7 and 12 conveyed. In this way one gave religious significance to life and placed one's existence in harmony with the divine order of the cosmos. By aligning and synchronizing the microcosm of one's individual and family life and the mesocosm of one's society and state with the macrocosm itself, life was tuned to the larger rhythms of this sacred order.

For us the overriding consideration in the use of numbers is their secular value in arithmetic. We must therefore have numbers that are completely devoid of all symbolic associations. Numbers such as 7 and 12 do not make our calculators or computers function any better, nor does the number 13 make them any less efficient. Our numbers are uniform, value-neutral—meaningless and powerless. What is critical to modern consciousness is having the right numbers in the sense of having the right figures and right count. This sense, of course, was also present in the ancient world: in commerce, in construction, in military affairs, in taxation. But there was also a higher, symbolic use of numbers. And in a religious context, it was more important to have the right numbers in a sacred rather than profane sense. While we give the highest value, and nearly exclusive value, to numbers as carriers of "facts," in religious texts and rituals the highest value was given to numbers as carriers of ultimate truth and reality.

Those, therefore, who would attempt to impose a literal reading of numbers upon Genesis, as if the sequence of days were of the same order as counting sheep or merchandise or money, are offering a modern, secular interpretation of a sacred text—in the name of religion. And, as if this were

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not distortion enough, they proceed to place this secular reading of origins in competition with other secular readings and secular literatures: scientific, historical, mathematical, technological. Extended footnotes are appended to the biblical texts on such extraneous subjects as the second law of thermodynamics, radiometric dating, paleontology, sedimentation, hydrology, and so forth. These are hardly the issues with which Genesis is concerning itself, or is exercised over.

The Impossibility of Literalism

The attempt to do a literal reading of Genesis cannot, in fact, be consistently pursued. And it is not, in actual practice. Creationists are literalists up to a point, but when their particular line of interpretation runs into an insurmountable difficulty they take that particular item "metaphorically," or concoct some fanciful explanation which is far more symbolic than the interpretation they are attempting to avoid. The rule of thumb seems to be to take everything as literally as possible: give in only as a last resort. Thus the assumption is that religious truth equals literal meaning, when in most contexts the opposite is the case: religious truth equals symbolic meaning. The first questions in interpreting the text are never clearly asked: What kind of literature and linguistic usage is involved, what did the author intend, and what issues are being addressed?

In the case of the Priestly account, a literal reading is, at several critical points, impossible, contradictory, or simply unwanted. For instance, the imagery of *days* is used in the main body of the text, but the account concludes with the very different imagery of *generations*. The same word is used again in Genesis 5:1 to apply to the geneology of Adam, and these generations are calculated as being in the neighborhood of 100 years per generation —obviously not the equivalent of single days. Clearly both the term *days* and the term *generations* cannot be taken literally.

If one moves on to the Yahwist account in Genesis 2:4b-25, the literalist encounters greater problems. If the two creation accounts are interpreted chronologically, they hardly agree in details or sequences. In Genesis 1 the order given is vegetation (day three); sun, moon, and stars (day four); birds and fish (day five); land animals (first half of day six). In Genesis 2 the order is quite different. Sun, moon, and stars are already presupposed, and therefore are before vegetation rather than after: "when no plant of the field was yet in the earth and no herb of the field had yet sprung up . . . then the Lord God formed man of dust from the ground" (2:5-7). Adam is created also before any of the animals, rather than after as in Genesis 1. Eve, on the other hand, is created after vegetation and animals, not at the same time as Adam,

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as in Genesis 1. One would think that these glaring differences would be a sufficient indication that literal historical sequences could not be the original concern or intent.

The treatment of water in the two accounts is also quite different. Genesis 1 begins with watery chaos, and with the problem of separating this water into the waters above and the waters below (day two), as well as the problem of separating the earth from the engulfing waters (day three). In other words, the setting of Genesis 1 is one in which there is so much water that "the dry land" must be made to "appear" (1:9). Genesis 2, however, begins with the opposite problem: no water at all. The order is therefore quite the reverse of Genesis 1: first there is dry land, then water is introduced. Rather than formless earth needing to be separated from the embrace of the waters, the barren earth *needs* water in order for vegetation to appear: "for the Lord God had not caused it to rain upon the earth, and there was no man to till the ground; but a mist went up from the earth and watered the whole face of the ground" (2:5, 6).

The differences between these two ways of organizing the issue of origins is the result of two contrasting life-settings in the history of Israel, the agricultural-urban and the pastoral-nomadic. Genesis 1 has drawn upon the imagery of the great civilizations inhabiting the river basins and areas adjacent to the sea, while Genesis 2 has drawn upon an imagery more in accord with the experience of wandering shepherds and goatherds living on the semiarid fringes of the fertile plains. There is precedent in the history of Jewish experience for both. For the shepherd nomad in search of green pastures, and moving between scattered springs, wells, and oases, the primary problem in life (and therefore in creation) is the *absence* of water. Water must be diligently sought out and is a scarce and precious commodity. What is in abundance is dust, sand, and wilderness rock. Thus the Yahwist begins quite naturally with a barren earth onto which water must be introduced. If there is an equivalent to the imagery of an initial chaos, it is not a watery chaos but a desert chaos.

The literalist, attempting to synchronize these two accounts with each other, and then with modern science and natural history, faces an impossible task. This is further substantiated by observing the inability of a literal approach to handle the puzzling imagery with which Genesis 1 begins. "The earth was without form and void, and darkness was upon the face of the deep; and the Spirit of God was moving over the face of the waters" (1:2 RSV). If one tries to take a literal interpretation, one immediately encounters the curious difficulty that none of the three realities mentioned in this introductory verse is referred to as created by God, either here or in the subsequent days of creation. On the first day *darkness* is presupposed, while it is light that is created and separated from the darkness. On the second day

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water (the deep) is presupposed, while the firmament is created, separating the water into the waters above and the waters below. And on the third day the formless *earth* is presupposed, being separated from the waters "under the heavens" which are "gathered together into one place, letting the "dry land appear."

This being the case, if one is determined to take the account literally, one achieves a very awkward and unwanted result: God created everything but darkness, water and earth, which are therefore co-eternal with God. It is also totally contrary to all scientific evidence, whether geological or astronomical, that either water or earth existed before light (day one), sky (day two), or sun, moon, and stars (day four). Darkness perhaps, but not water and earth.

These difficulties can only be resolved by a different interpretative approach which clarifies the literary form of the account, the reasons for selecting this particular form, and the reasons for developing the content of the passage in this particular order and manner. The basic literary genre of Genesis 1 is *cosmological*. And, inasmuch as it is dealing specifically with origins, it is *cosmogonic*. In order to interpret its meaning one has to learn to think cosmogonically, not scientifically or historically. This does not mean that the materials are, in any sense, irrational or illogical. They are perfectly rational and orderly, and have a logic all their own. But that logic is not biological or geological or paleontological or even chronological. It is cosmological and theological.

The Cosmogonic Form

Cosmogony is a common literary form in the ancient world, though the monotheistic content of Genesis 1 is certainly different from the highly mythological, polytheistic content of other cosmogonies. There was an established cosmogonic vocabulary with which the Priestly author could work. The motif of a primordial chaos, characterized by a combination of "chaotic" features, such as watery deep, darkness, formlessness, boundlessness, is a familiar theme in ancient Near Eastern cosmogonies. In Egyptian myth this original reality is described in terms of four primordial pairs of divinities, representing the qualities of this relatively undifferentiated cosmic brew. Nun and Naunet are the Primeval waters; Kuk and Kauket are the primeval darkness; Huh and Hauhet are the boundless primeval formlessness; and Amun and Amanunet are the obscurity and indefinability of this mysterious source of that which now has clear definition and place. Out of this beginning rises the primeval hill, like a muddy, fertile hillock from the receding waters of the Nile. Subsequently come the appearances and separations of the sun (Atum), air and moisture (Shu and Tefnut), sky and earth (Nut and Geb), and so forth. The logic of the

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cosmogony is that, if things now form an ordered cosmos, with each sphere clearly demarcated, there must first have been a time when they came to be what they now are out of an initial state in which this situation did not obtain—that is, chaos. And water is a natural candidate for depicting this formless beginning.

Sumerian cosmogony, similarly, began with the primeval sea (Nammu) which gave birth to the cosmic mountain, with earth (Ki) as its base and heaven (An) as its peak. Earth and heaven then begat air (Enlil) who, like Shu in Egyptian myth, separates and stands between them. Likewise the Babylonian *Enuma elish* depicts a beginning in which there was only water. The primeval ocean, in this case, is pictured as the confluence of the fresh lake and river waters of Apsu (male) and the salt sea waters of Tiamat (female), whose commingling begets the gods. Or as another, hymnlike version, found at Sippar, paradoxically phrased the beginning: "All lands were sea; then there was a movement in the midst of the sea."

Such aboriginal waters not only were seen as the source of life and fertility, but as having the potential for taking back and destroying what they have given. In the Egyptian *Book of the Dead*, Atum warns of the possibility that "the earth will return to the floodwaters, as in the beginning." Because the Nile river is relatively placid and regular this theme does not take on the dramatic proportions that it does elsewhere. In Canaan the god of rainfall and fertility, Baal, subdues Yam, god of the sea, and defeats Leviathan (the serpentine), also called Rahab (the ferocious). He thus gains control of the weather and seasons, and brings about order. Similarly, the Hittites to the north celebrated at the New Year the victory of the weather god who had conquered the primeval waterdragon, thus placing rainfall under his dominion and regulation.

In the Mesopotamian plains, with the greater irregularity of flooding along the Tigris and Euphrates rivers—as instanced in the extreme with the Great Flood accounts in Genesis 6-9 and the Babylonian Epic of Gilgamesh, whose details are quite similar—this invasion of the waters is a perennial threat. Sumerian myth recounts a sinister plot to inundate the plains, which was subverted by the god Ninurta (or goddess Inanna) who channeled the subterranean waters through the banks of the Tigris and Euphrates. Both Genesis and the Gilgamesh epic, of course, recount a "sinister plot" that *was* carried out. And much of the Babylonian epic of *Enuma elish* is taken up with the conflict between the water goddess, Tiamat, and her progeny, as she threatens to destroy the cosmos to which she had given birth.

When Genesis 1 calls upon similar images in describing the initial state of things, they are well-known images found along a great cultural arc that runs from Egypt in the south and Greece in the north through Palestine and Mesopotamia to India. And they have a venerable antiquity—in several cases, an

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antiquity of one or more millenia earlier than the Priestly account. While the imagery has presented problems for a modern interpretation, it was, and had been for many peoples for a long time, a perfectly natural way to begin a cosmogony.

In this cultural milieau which Genesis 1 broadly shares, the primary cosmological problem to be addressed was the problem of water. Actually water presents a double problem: its abundance and its formless ("chaotic") character. Water has no shape of its own, and unchecked or uncontained, as in flood or storm, can destroy that which has form. Similarly, the earth, engulfed by formless (unformed) water is inevitably formless. Darkness, also, is dissolvent of form. These problems, therefore, in the logic of the account, need to be confronted first. The ambiguousness of water, darkness, and formless earth must be dealt with in such a way as to restrain their negative potential and unleash their positive potential.

The ensuing organization of materials is best understood by seeing this initial verse as describing a three-fold *problem* (the ambiguous potential of formless darkness, water, and earth) which is then given a *solution* in the first three days of creation. The first day of creation takes care of the problem of darkness through the creation of light. The second day takes care of the problem of water through the creation of a firmament to separate the water into the waters above (rain, snow, hail) and the waters below (sea, rivers, subterranean streams). The third day takes care of the problem of the formless earth by freeing earth from the waters and darkness and assigning it to a middle region between light and darkness, sky (with its waters), and underworld (with its waters). This then readies the cosmos for populating these various realms in the next three days, like a house readied for its inhabitants.

We thus observe a division of the account into three movements (problem, preparation, population), each with three elements. The problem of the three "chaotic" forces is resolved in the first three days of creation by restraining their negative potential and unleashing their positive potential. As a result a harmonious context is established in preparation for the population of these three regions. The light and darkness of day one are then populated by the sun, moon, and stars of day four. The sky and waters of day two are populated by the birds and fish of day five. The earth and vegetation of day three make possible a population by the land animals and human beings of day six. The account should thus be read as if written in three parallel columns (shown on page 18).

In this way of reading the account, the dilemmas that arise for a literalist interpretation disappear. Three problems, which are envisioned as difficulties for cosmicizing, are dealt with first, followed by a sketch of the way in which these cosmic regions are then inhabited. This is the logic of the account. It is not chronological, scientific, or historical. It is cosmological. The procedure is

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Problem (vs. 2)	Preparation (days 1-3)	Population (days 4-6)
Darkness	1a Creation of light b Separation from darkness	4a Creation of sun b Creation of moon, stars
Watery abyss	2a Creation of firmament b Separation of waters above from waters below	5a Creation of birds b Creation of fish
Formless earth	3a Separation of earth from sea b Creation of vegetation	6a Creation of land animals b Creation of humans

not unlike that of a landscape painter, who first sketches in with broad strokes the background of the painting: its regions of light and darkness, of sky and water, and of earth and vegetation. Then within this context are painted birds and fish, land animals, and human figures. It would be quite inappropriate for anyone to try to defend the artistic merit of the painting by attempting to show that the order in which the painting was developed was scientifically and historically "correct."

Myth, Legend, and History

The implication of this discussion should not be taken to mean that everything in Genesis is non-historical or without interest in history. Both the Priestly and Yahwist accounts of creation are the beginning paragraphs of histories of Israel, which had commenced with the origins of nature and humanity, moving through a kind of universal history to the particular history of Israel. But using the word *history* for all of these materials is misleading, if we mean by the term a single, uniform concept of historical construction, such as modern historians might attempt to achieve.

The interest of the Genesis authors was not strictly and solely historical. In the first place they were concerned with collecting and preserving the stories that were an ancient part of the Jewish heritage, handed down largely by oral tradition. They were also concerned with arranging these stories in their relative historical order, so there is a sense of chronology and historical movement operative. In the Yahwist history, the destruction of civilization in the flood, for example, is placed after rather than before the story of Cain,

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the father of civilization. The Priestly interest in geneological lists and in dividing up materials into periods is certainly sequential and systematic. And thirdy, the authors were concerned with using these stories as instances of various theological and ethical truths. The accounts are thus fundamentally *theologies* of history and moral treatises.

Only the second of these concerns approximates a modern, secular understanding of historical writing. And, of these three, it is not the second but the first and third that are central to the purposes of the biblical writings. Consequently, it is difficult to make a clear, unequivocal use of the term *history* to apply to these materials, let alone terms such as *information*, *record*, *straightforward narrative*, or *factual*, *natural*, *clear*, *definite*, *matter-of-fact*. To try to apply such terms is misleading in the extreme and greatly distorts the real character and intent. The literalist view is not even a good representation of contemporary understandings of historical writing and sounds rather like the objective ideal of newspaper reporting. Again we have the problem of literary type. The biblical materials are only partly similar to the type of literature which we might acknowledge in our culture as being historical writing; there is certainly little similarity to journalistic reporting, television newscasting, or courthouse record-keeping.

Literalists are not the only ones to have done disservice in this regard to the special genius of these ancient texts. Some liberal interpreters, particularly of the late nineteenth and early twentieth century, tended to agree with the literalists that the simple, literal meaning of these stories was what the authors believed—that it reflected the childlike simplicity of folk belief of the time, which postenlightenment moderns, in their great wisdom and sophistication, could no longer accept. Hermann Gunkel, for example, in his influential *Commentary on Genesis* (1901), while defending the poetic beauty and religious profundity of the Genesis sagas, as he called them, nevertheless frequently spoke as if they were literally understood by those who told them. The stories and their details are frequently referred to as "primitive," "naive," "childish," "infantile," and "quite incredible." They are seen to be offering *explanations* of a variety of phenomena that puzzled the ancients, such as why snakes did not have legs like lizards, and thus as representing the "humble beginnings" of science and history. For all these matters we now have, of course, better explanations by virtue of the scientific and historical rigor that eventually succeeded in emancipating itself from such myth, saga, and legend.

There are several misunderstandings in this way of dealing with the biblical materials as well. The primary function of great myths and legends is not that of offering explanations, as if intellectual curiosity were the central issue. There may be miscellaneous stories, or parts of stories, in which the etiological element is central. But the great stories are not concerned with providing

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a miscellany of information or ready-made answers for inquisitive children. They were understood as vehicles of the most basic and important truths of all by which people organized, regulated, and interpreted their lives, and through which they saw meaning, purpose, and value in their existence. Myths and legends, together with rituals, provided the overarching frame of reference within which to live and experience and celebrate the world. As such they are not superseded by modern science or historiography, for they belong to a different level of meaning and expression. Insofar as there is an explanatory element in the stories, such as the origin of languages in a divine judgment on building the Tower of Babel, this may be supplanted by later understandings of linguistic development. But the central religious affirmations can neither be supplanted nor supported by subsequent knowledge, any more than Sophocles' *Oedipus* is replaced by Freud's *Totem and Taboo* or Michaelangelo's *Pieta* by NASA's moonlander.

To be sure, there is a child's level—generally unreflective level—in which the literal and symbolic, explanation and interpretation, are not clearly distinguished. And it may be that at some earlier time, or at the popular level of their own time, these biblical stories were understood in a simplistic fashion. But this does not mean that the Genesis authors themselves necessarily understood matters in this way. They appear rather to be collecting and arranging and reworking ancient stories, cosmological images, and the like, which are a familiar part of the Judaic heritage, or familiar *to* the Judaic heritage. And they appear to be doing this, not for the purpose of teaching these stories as such (in the modern sense of teaching history or science), but in order to preserve them as an important part of that heritage, to organize them, and to use them as familiar vehicles for conveying theological, moral, and spiritual truths. The narrative form is not the message; the religious content is the message.

But, in spite of all this, there is indeed some historical value or basis in the Genesis stories. The Garden of Eden, for example, contains a postulation, if not ancient remembrance, of a foodgathering stage which preceded sheepherding (represented by Abel and, later, Seth) and agriculture and urbanization (represented by Cain). Eve's first eating of the fruit of knowledge, which led to agriculture and eventually urbanization, may have some historical basis in the probable origins of agriculture in simple plantings by women, and certainly in the association of women with earth, water, fertility, and sedentary life. After he is expelled from the foodgathering paradise, Cain becomes the first farmer and first city-dweller; his name literally means "smith." He bears the mark on his forehead used to set apart smiths, and among his descendants is Tubal-cain, "the forger of all instruments of bronze and iron" (Gen. 4:22) (For extensive discussion of this, and other mythological and cultural data which illuminate Genesis 1-11, see Gaster, 1969). Cain's quarrel with Abel is

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certainly an accurate historical reflection of the tension between nomadic pastoral peoples, who lived on the perimeter of the fertile grassland and farmland of the plains, and the sedentary agriculturalists—not unlike the conflicts of farmers with cattleherds and shepherds in the American West of the nineteenth century.

Similarly, the flood story in Genesis 6-9 (and in the kindred *Epic of Gilgamesh*) is based in the flood experiences of the Tigris and Euphrates river valleys, and in particular in one great flood that inundated the Mesopotamian plains before 3000 B.C.—which for the people of that region and time would have been their "world." It is also quite plausible that some escaped in boats and took animals with them. Sir Leonard Wooley's excavations around Ur in 1929-30 uncovered a silt deposit eleven feet deep, with artifacts of human habitation above and below, which he estimated would have been made by a flood that covered the whole Mesopotamian region, as much as 30,000 square miles, twenty-six feet deep—corresponding to the fifteen cubits depth mentioned in Genesis (Daniel, pp. 39-47).

Still, to dwell on the historicity of the accounts, even only an historical core, is to stray from the purposes of the writings. They are not aimed at providing a "truer" picture of the universe or of human history, let alone the *only* true picture, in the modern scientific or historical senses of *true*. They are aiming rather at providing a truer theological and moral picture of the universe, using accessible and time-hallowed materials. One of the many ironies of creationism is that, in its consuming passion to be faithful to its scriptures, it turns attention away from the central religious concerns of the biblical authors and focuses it on issues that are largely modern and secular. In so doing, creationists are not nearly as conservative as they suppose. They are modernistic and secularistic. And they have sold their religious birthright for a mess of tangible pottage.

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Scientific Creationists Are Not Catastrophists

Robert Schadewald

Catastrophism dominated geology a century and a half ago, but it withered and died in the decades following the publication (1830-33) of Charles Lyell's three volume *Principles of Geology*. Creationists—most notably Henry Morris—represent their Flood Geology as a revival of catastrophism. Indeed, Morris often hints that modern geologists are slowly coming his way. Thus he has said, "It should be recognized that there is a resurgence of significant consideration of catastrophism among evolutionary geologists today, Dr. [Stephen Jay] Gould being one of them" (Morris, 1981).

Modern geologists are well aware that violent events have played a part in the earth's history. The earth bears the scars of numerous giant meteorite impacts. The Channeled Scablands of Washington were apparently eroded by a catastrophic flood caused by the failure of an ice-dam holding back a lakeful of glacial meltwater. Some scientists suggest that a comet struck the earth near the end of the Cretaceous era, resulting in the mass extinctions of species characteristic of that time. Indeed, the British geologist Derek Ager holds that violent events and processes are responsible for much of the geologic column, and he calls himself "an unrepentant neo-catastrophist." But Henry Morris cannot, in any legitimate sense, be called a catastrophist. True catastrophists, whether 19th century or modern, have without exception rejected Morris's Flood Geology.

Geology arose in Christian Europe, so it's hardly surprising that the early geologists—Nicolaus Steno, John Ray, John Woodward—attributed the fossils to the Noachian Deluge. As the 18th century drew to a close, however, it became clear that the Earth had to be much older than the 6000 years alloted by Archbishop Ussher, and that a single flood could not account for all of the fossils. This does not imply that James Hutton's Uniformitarian theory, published in his *Theory of the Earth* in 1785, met immediate acceptance. Quite the contrary.

At the beginning of the 19th century, the German Abraham Gottlob Werner was perhaps the world's most influential geologist. Werner taught that

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all of the earth's rocks originated in a primeval ocean, either by chemical precipitation or sedimentation. Werner's followers were called "Neptunists." Those who correctly attributed rocks such as basalts and granites to volcanic processes were called "Vulcanists." The Vulcanists soon triumphed, and many of them came to be associated with a new school of geology, catastrophism.

The most famous and influential catastrophist was Georges Cuvier, the most brilliant paleontologist and comparative anatomist of his time. Cuvier's studies of the geology of the Paris region convinced him that the large vertebrate animals whose fossils were so abundant in the area had been wiped out in devastating regional (*not* worldwide) floods caused by incursions of the ocean. Cuvier is often credited with promoting successive creations destroyed by successive catastrophes, but he never said that. Other catastrophists—notably Louis Agassiz—did.

Catastrophism flourished in early 19th century England. Catastrophists agreed with their principal opponents, the uniformitarians, that the earth is very old and that its rock strata have been laid down sequentially over a considerable time. The argument was over what (if indeed any) role extremely violent events played in the earth's history. For instance, catastrophists insisted that only unimaginably violent events could account for the folding and tilting sometimes seen in the earth's rock strata. Uniformitarians held that gradual, sustained processes were sufficient.

All of the principal participants in this scientific controversy were Christians, many of them ordained clergymen, but they were generally loathe to mix science and religion. If pressed to reconcile Genesis with geology, some argued for the "day-age" theory, suggesting that the creation "days" correspond to geologic eras. Others adopted the "gap-theory," suggesting that most of the geologic strata were laid down between the original creation in Genesis 1:1 and the subsequent events in Genesis.

In the 1820s, William Buckland, Adam Sedgwick, and a few other "diluvialists" argued that river valleys and certain superficial sedimentary deposits (*not* all sedimentary rocks) resulted from a recent and worldwide flood. Within a few years, Buckland's own field work, especially his investigations of alluvial deposits in caves, began to seriously undermine the diluvialist position. It quickly became untenable, and Millhauser (1954) describes how, in the mid-1830s, soon after the publication of Charles Lyell's *Principles*, Sedgwick and Buckland abandoned diluvialism. Buckland replaced his "diluvialism" with the "tranquil flood" theory, which holds that the Noachian Deluge left few if any traces in the geologic record. George McCready Price, founder of modern Flood Geology, clearly recognized that none of this had anything to do with his ideas. "The theory of 'Catastrophism,'" he wrote, "as held a hundred years ago, had no resemblance to the theory here discussed, except in name (Price, 1931; 101)."

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Even before Lyell published his *Principles*, an ersatz school of geology arose to challenge the gap theorists and other theological compromisers (Millhauser, 1954). Like modern scientific creationists, this group insisted on a recent and literal six-day creation and a worldwide Noachian Flood. They were known, both to themselves and to conventional scientists, as "Mosaic" or "Scriptural" geologists.

Thomas Rodd, Granville Penn, and George Bugg were representative. Rodd's *A Defence of the Veracity of Moses* appeared in 1820. More important was Granville Penn, whose 1822 *Comparative Estimate of the Mineral and Mosaic Geologies* defended with "rather shrill logic" (Millhauser, 1954) views hardly distinguishable from Henry Morris's. George Bugg's two volume opus, *Scriptural Geology; or, Geological Phenomena Consistent Only with Literal Interpretations of Sacred Scriptures*, appeared in 1826-27. Bugg abused Buckland and distinguished between even the pious Cuvier and "Christian" writers (Millhauser, 1954). Among those responding was Adam Sedgwick, an Anglican clergyman and an outstanding field geologist, who with Buckland first espoused but later abandoned diluvialism. In his 1830 presidential address to London's Geological Society, Sedgwick replied to the "Mosaic" geologists with a devastating broadside.

When the first volume of Lyell's *Principles* was published in 1830, and the great controversy between uniformitarians and catastrophists began in earnest, the Scriptural Geologists declared a plague on both houses. Though scientific geologists of all persuasions generally ignored them, the flood of books and pamphlets on Scriptural Geology didn't abate until late in the 19th century.

So why does Henry Morris ignore his true intellectual ancestors? Why does he try to call Cuvier, Buckland, and other early 19th century catastrophists from their graves to testify in favor of doctrines they uniformly rejected? Perhaps Morris doesn't know any better. He apparently drew most of his ideas from George McCready Price, and Price sometimes called his stuff "catastrophism" even though, as shown earlier, he *did* know better. Or perhaps Morris knows better but hopes to "borrow" some legitimacy for Flood Geology by falsely associating it with genuine (though obsolete) science. Or perhaps it's political expediency. Morris vehemently insists that "creation-science" can exist independent of the Bible. Thus it would hardly do for him to admit that his Flood Geology was traditionally called Scriptural Geology.

Acknowledgement

I thank Malcolm Kottler for reading an early draft of this manuscript and gently steering me around a few historical catastrophes.

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A Handy Source of Arguments for Speakers and Debaters

The effective booklet, *Creation or Evolution*, by John Bowden, offers a gold mine of point-by-point responses to many creationist arguments. Although written a decade ago, it continues to be relevant because of the many unchanging creationist positions.

Bowden discusses the Bible, the early history of the creationist movement, the age of the earth, the fossil record, human evolution, the "animal wonder" arguments of creationists, and the origin of the universe. In answer to creationist "animal wonders," Bowden provides a broad range of zoological tidbits, data on parasites, and information on poorly adapted and vestigial organs. For those needing a handy source of effective answers, this book is a must.

Bowden writes from a rationalist freethought perspective; yet his arguments remain useful for those of any persuasion who oppose creationism.

To order your copy, send two dollars to *Creation/Evolution*, Box 146, Amherst Branch, Buffalo, NY 14226. You may order as many as you like, as we have received a large shipment from Australia.

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The Supposed Dichotomy between Creationism and Evolution

J.B. Gough

One of the questions most frequently put to biblical creationists is that if from notions of fairness we must teach creationism in our public schools, then should we not in fairness also teach all the alternative theories dealing with the origin of biological forms? And if we are, indeed, obliged to teach them, where can we possibly find the time to do so? To this objection, biblical creationists reply that there are only two mutually exclusive alternatives, only two logically-possible explanations for the origins of biological species—creationism and evolution—and that students will profit from being exposed to both models (Morris, July 1975, p. 4; Morris, 1974b, p. 16 and 1977, p. 3).

Rarely in the realm of ideas do we find alternatives so sharply defined as to leave no room for intermediate views. Almost any idea worthy of serious consideration is composed of numerous, independent parts with subtle shadings of emphasis and some measure of openness, flexibility, and capacity for growth and change.

Fanatical, embattled groups seem prone for some reason to create a closed, rigid dogma and a spurious dichotomy between themselves and all those who are not in complete accord with their doctrinal enthusiasms. It is, perhaps, this "us-them" mentality which seems to preclude the possibility of a middle ground. Religious and ideological zealots tend to lump all their opponents together no matter how wide a diversity of opinion they may represent. To McCarthyites, for example, there existed on the one side only those who wholeheartedly supported the vituperative senator from Wisconsin and on the other a nefarious band of communists, communist sympathizers, fellow travelers, and dupes—all, of course, sub-species of one and the same thing. Similarly, biblical creationists have constructed a sort of Manichaean dualism between their own little inner world of blessed light and the satanic outer world of Darwinian darkness. They hold evolution responsible for many, if indeed not most, of the major ills of our times—for communism, fascism, racism, imperialism, rising crime and modern education (Morris, 1974a, pp.

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25-48). Evolution, so they preach, is the creed of Satan himself and to combat it, to place in its stead the antithetical doctrine of creationism is, by implication, nothing less than to point the way toward the world's salvation (pp. 75-76).

However, in order for a sharply defined dichotomy between two mutually exclusive intellectual positions to exist, the definitions of those positions must hinge on the acceptance or rejection of a single, simple proposition. In the case of evolution, this is very nearly the case: those who accept the idea that the various species have a common descent can probably be counted as evolutionists. (Some might also wish to include in the definition of evolution the notion that the descent takes place in relatively small steps and that the entire process is naturalistic.) Those who reject the idea of common descent are quite definitely not evolutionists. But not being an evolutionist does not, in itself, define a single intellectual position. Not being an evolutionist does not, for example, make one a creationist. In order to discover why this is so, we must examine the fundamental premises upon which biblical creationism rests.

Creationists have a lamentable tendency to confuse matters by making an issue of speculations concerning the origin of life and cosmogenical theories such as the "Big Bang" (Morris, 1974b, pp. 17-51). I will limit my analysis here to the central scientific issues, that is, to theories concerning the appearance of diverse life forms on the earth.

If we examine the creationist literature in this regard, I think we can isolate *at least* five independent propositions that are basic to the biblical-creationist view: all living "kinds" on earth were (1) suddenly and (2) nearly simultaneously (3) created (4) at a relatively recent date (5) by a supernatural cause. Since none of these propositions is tautological, and each is independent from the others we may accept or reject the propositions in any combination whatsoever. Thus from these five propositions alone (without introducing any new or different ones), we may construct no fewer than 32 distinct positions with regard to the origins of diverse life-forms. Some of the resulting theoretical schemata, it is true, are *prima facie* absurd, or at any rate, difficult to maintain in face of the scientific evidence, but scarcely any more so than the biblical creationist creed itself. If, in the name of fairness, we are obliged to introduce biblical creationism into the public schools, then should we not in fairness be obliged to bring into the classrooms at least some of the more sensible choices as well?

It might be thought that the dichotomy that the creationists are trying to draw is not really between creationism and evolution per se, but between the acceptance of supernatural causes in science and the admission of naturalistic explanations only. Henry Morris seems, in fact, to draw nearly this distinction in his book *The Scientific Case for Creation* (1977, p. 3).

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There is, however, a supernaturalist position that the biblical creationists consistently reject. Some people have adopted a hybrid theory of directed or theological evolution which posits both supernatural causes and quasi-telic acts of creation in a framework of common descent, but which rejects the three creationist suppositions of suddenness, simultaneity, and recent origin. In fact, this option was the choice (much to Darwin's consternation) of the first, great American champion of evolution, the Yale botanist, Asa Gray, who believed that the Deity manipulates the variation in offspring in order to produce favorable results (Dupree, 1968, pp. 296-301). Directed evolution of some sort must still be common enough among some of the more liberal fundamentalists since creationists never miss an opportunity to condemn it on both biblical and "scientific" grounds (Morris, June 1973; Niessen). The theory, they say, is merely a sub-species of evolution. Obviously, then, the dichotomy that exists in the minds of the creationists is not founded solely on the distinction between naturalism and supernaturalism.

From the evidence of the creationist literature and from the model creationist law circulated by Paul Ellwanger's Citizens for Fairness in Education, it is evident that contemporary, conservative, biblical creationism presupposes all five of the aforementioned premises (and, perhaps, in addition, some geological propositions designed to preserve the historicity of the Noachian Deluge). This leaves innumerable, perhaps even unlimited possibilities that are neither creationism nor evolution.

For example, one could accept the suddenness and simultaneity of the appearance of life forms on earth (while rejecting the other three creationist criteria) by supposing that the original members of various species (both living and dead) were off-loaded from a kind of cosmic ark, piloted by astronauts from another stellar system. This in turn could be placed in the context of a theory which supposes that the basic life-forms are co-eternal with an eternal, steady-state universe and that interstellar colonizing is the way life propagates itself in the newly emergent regions of the cosmos. In the changing environment of the freshly-inhabited planet, not all species were successful, and some eventually died out. On other worlds, with different climates and geologies, the dinosaurs still reign, and most mammals exist only as fossil remnants. This "biostatic" theory (which is about as sensible and as easily reconcilable with modern science as biblical creationism), is clearly neither evolution nor creation and deserves about as much consideration as the latter.

Elements of this biostatic theory are reminiscent of pansemnia, a hypothesis that dates back at least to Benoit de Maillet's famous *Telliamed* of 1748 (Corozzi, 1969 and 1974). According to Maillet's formulation of the theory, seeds of the various life-forms are distributed throughout the universe, and when they by chance find themselves in a favorable (usually aqueous) environment, they mature and reproduce. Over time, the species undergo a slow

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transformation, better adapting themselves to the changing environment of their new-found planet, becoming more complex and versatile, and finally extending their range from the sea to the land and even to the air. Although Maillet includes in his hypothesis a slow development of the species over time, his theory is not at all evolutionary. In Maillet's view, distinct kinds of species have distinct ancestors. The progenitors of men, for example, were mermen; the progenitors of apes were presumably mer-apes. There was no common descent and thus no genuine evolution. This limited type of specific metamorphosis is called "transformism" (to distinguish it from evolution), and it was relatively common in French biological thought before Darwin. With some doctoring and a little imagination, it would be possible to make "pansemnial transformism" (as we might designate this theory) at least as conformable to the discoveries of modern science as biblical creationism, and if the latter deserves equal time in our public schools, then so does the former.

A true dichotomy (or something very close to it) could probably be maintained if creationists would only choose the one criterion that has to be the essence, the *sine qua non* of any hypothesis that calls itself creationism, namely the assertion of creation itself, the affirmation that life has arisen through creative acts. Generally speaking, things exist either naturally or artificially; they are either designed or made consciously, or they arise fortuitously through the blind operation of the laws of nature. With the possible exception of directed evolution, this formulation of the alternatives leaves little room for a middle position. Indeed, Richard Bliss of the Institute for Creation Research has come close to defining the creationist position in just such a way. In a letter to the *Lewiston* (Idaho) *Morning Tribune*, he writes:

> The models, as they stand, evolution being random, mechanistic and naturalistic on the one hand, and creation being design oriented by a Creator and not random on the other are, in fact, mutually exclusive models.

It should, of course, be pointed out that the alternatives here are not really creation and evolution, but biocreationism and bionaturalism. The choice is between the notion that life-forms were consciously and purposefully designed and the notion that they simply "sprang up" accidentally within the limiting framework of the basic laws of nature. In this formulation of the dichotomy, the previously-mentioned theories of biostasis and pansemnial transformism count (along with evolution by natural selection) as sub-species of bionaturalism.

But even this delineation of the alternatives would, I fear, not begin to satisfy the biblical creationists: it leaves far too much room for the most blatant forms of heresy.

For example, a theory quite common in early nineteenth-century Britain supposed that the history of the earth has been one of periodic catastrophes

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in which large numbers of species are destroyed. Between cataclysms, new species are created to fill the ecological gaps left by the extinction of the old. (The last in this series of catastrophes was the Noachian Flood.) This theory, which is sometimes called "progressive creation," accepts sudden creation by a supernatural cause, but it rejects the biblical-creationist assertions of simultaneity and recent creation.

Perhaps progressive creation is close enough to the biblicist position to be accepted by creationists as a sub-model of their hypothesis. But there are more radical creationist models that I am certain they would reject.

For example, let us suppose that about four billion years ago voyagers from a nearby planetary system happened upon our earth. Recognizing the suitability of the terrestrial environment for the sustenance of life, they decided to use our planet as an immense biological laboratory. In the rich organic soup of the primitive oceans, they planted a simple, but viable polymer of DNA (or perhaps RNA). In subsequent visits over eons of time, they slowly created a succession of life forms by adding bits of genetic material to the genes of already-living beings, by fusing and multiplying chromosomes, and by grafting genes from one species onto genes of others. As their technology improved, they were able to handle the difficult genetics of more complex organisms—engineering first single-celled plants and animals, then multicellular forms, progressing from coelenterates and worms to fishes, birds, and mammals. Finally, in the fullness of time and technology, they created in their own image a rational animal, capable of understanding the processes of his own origins. If one assumes only one visit every four thousand years, they could have achieved the present state of biological complexity in about one million visits.

This "little-green-man hypothesis," or "chloranthrobiogenesis," as we might term it, has all the teleology of the biblical-creationist theory, but unlike biblical creationism, it does not contradict the basic facts of modern science. It accepts the succession of the fossil record, the age of the earth as established by measurements of radioactive decay, and the order of the geological strata. Unlike biblical creationism, it explains quite as satisfactorily as evolution the existence of useless or vestigial organs and the biochemical, morphological, and ethological similarities of related species and genera. In short, it is far more reasonable, far more consonant with modern science than biblical creationism can ever be. And yet, chloranthrobiogenesis is not evolution at all. It is a kind of scientific creationism.

Given, then, this rich array of choices, why is there no Progressive Creation Society? Why no Institute for Pansemnial Research? Why no Fellowship of the Friends of the Chloranthropoids? Why are there no voices raised, petitions signed, pamphlets written, propaganda aired, or laws formulated in support of any of these alternative theories of biological origins? The

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answer is simple: none of these alternatives is found in the book of Genesis.

Had the ancient Jews been as fancifully imaginative as Benoit de Maillet, then the Blisses, Gishes, Morrisses and Slushers would all be ardent pansemnial transformists; for their ultimate criterion of truth, the standard by which they measure the validity of any proposition is not reason and experience, but an unshakable faith in an inflexibly literal reading of Scripture. I suppose all theories are to some degree procrustean, but the creationists have made the bed of Procrustes into an altar upon which they sacrifice to their primeval gods any science they find incommodious to their belief. Thus have they dispatched relativity and quantum mechanics, modern astrophysics and cosmology, two hundred years of geology, and more than a century of basic biology.

There exists, in fact, a dichotomy, and it is this: those who use scientific principles to reason about nature choose evolution; those who use the biblicist faith as a presupposition often choose biblical creationism. These are not, as we have seen, the only alternatives that logic and reason can provide. They are, rather, the limited alternatives provided by cultural, historical, and social forces.

Defenders of evolution often complain that the creationists spend virtually all their time attacking evolution and almost no time at all in developing a creationist model or in adducing evidence for creationist ideas. The reason for this, in large part, is that the creationists have been assuming: if not evolution, then biblical creation. In other words, if evolution is false, then creationism must necessarily be true. As we have seen, the logic of this position is utterly without merit.

In conclusion, it is important to note that the repeated use of the term "evolutionist" throughout this article is a necessary consequence of the nature of the discussion and does not imply that there exists anyone within the scientific community who may properly be described as such. Among scientists the term is an anachronism. There are no more "evolutionists" among biologists than there are "round-earthers" or "heliocentrists" among astronomers, "Einsteinians" among physicists, or "antiphlogistonists" among chemists. We may say of a person that he or she is right-handed because there are many who are left-handed, but we would never say of someone that he or she is "one-headed" simply because to say he or she is a person implies as much. So too, to say a person is a scientist encompasses the fact that he or she is an evolutionist. In scientific circles the term is redundant and is, therefore, never used.

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FREE TO STUDENTS AND EDUCATORS

A creationist publication worth watching is *Origins Research*. Published in tabloid form and issued 2-4 times a year, this periodical features short and to-the-point articles that attack evolution and occasionally argue for creation. Now in its sixth year, *Origins Research* has featured articles by leading creationists and has published stimulating editorials on news events related to the controversy. Even views of those on the evolution side have appeared in its pages, sparking lively debate. A four-part series entitled "Methods of Teaching Origins" by Dr. John N. Moore is particularly informative about the creationists' proposed approach to "balanced treatment" in the public schools. *Origins Research* is an intercampus newsletter published by Students for Origins Research and is free to all students or educators who request it. It is offered at a $2.00 yearly subscription rate for all other interested persons. To subscribe, write to Students for Origins Research, P.O. Box 203, Santa Barbara, CA 93116.

ORANGUTANS ARE HUMAN?

There is a superstition held by the natives of Malaya that the orangutan is really human, but he remains speechless in order to avoid the payment of taxes.

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Textbook Publishers Face Scientists and Educators

Stuart W. Hughes

The inordinate influence of "career censors" such as the Gablers of Texas is generating some backlash efforts by scientists and educators. Thanks to the stimulus of such articles as "Censorship of Evolution in Texas" by Steven Schafersman in the Fall 1982 issue of *Creation/Evolution*, Dr. James Ebert, vice president of the National Academy of Sciences and president of the Carnegie Institution of Washington, felt that by bringing publishers and authors of high school science texts together with educators, scientists, and book selection committee people, a fuller understanding of the dimensions of the censorship problem could be obtained.

A workshop was set up at NAS headquarters on July 21, 1983 with the stated purposes of "(1) describing the causes and extent of textbook alterations resulting from creationist pressures, (2) examining the nature of these pressures and (3) determining through discussion whether the scientific integrity of science textbooks can be maintained."

That "there has been a definite erosion in the coverage of evolution in all high school biology textbooks since the 1960s" (Skoog, 1983) was documented at the workshop by studies conducted separately by Gerald Skoog of Texas Tech and Malcolm Kotter of the University of Minnesota. While this erosion in coverage is obvious through casual observation of even the Biological Sciences Curriculum Study texts, the publishers claim it is due only to other reasons such as the overall reduction in text content.

Three of the most extreme examples of reduction in evolutionary coverage are: *Life Science* from Prentice-Hall, *Experiences in Biology* from Laidlaw and *Natural Science: Bridging the Gap* from Burgess. As reported in the Fall 1982 issue of *Creation/Evolution*, pp. 36-37, the New York City Board of Education declared those three texts unacceptable because of inadequate coverage of evolution. A quick check of the Philadelphia Public School text list showed that their textbook committee had also left those off their approved list. Probably as a result of these and similar actions in other northeastern districts, some publishers are taking a second look. Representatives of two of the three publishers in question were in attendance at the workshop

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and announced they were revising or supplementing their texts in regard to giving more coverage to evolution.

Another hopeful sign of improvement was the announcement that the Texas State Board of Education would henceforth allow positive comments about textbooks up for adoption as well as the traditional negative ones.

Several participants urged The National Science Foundation and school districts to support an upgrading of science teacher training in evolution so that teachers may become more confident in presenting evolution and less inclined to give it short shrift out of fear of controversy.

It was not the stated purpose of the workshop to promulgate any formal recommendations. However, at least this participant was left with the impression that publishers in attendance received the message that if the treatment of evolution in high school texts does not improve, many scientists and educators will increase their efforts to bring about changes.

Reference:

Gerald Skoog, *Recent Trends in the Coverage of Evolution in High School Biology Textbooks*, a Paper presented at a Workshop on Secondary School Science Textbooks, National Academy of Sciences, Washington, D.C., July 21, 1983.

News Briefs

Texas Victory

A significant victory was won in Texas this winter when citizens and citizens groups led by People for the American Way challenged the textbook selection process used by the Texas State Board of Education.

The process was originally set up so that only those citizens with complaints about a proposed textbook could testify at the public adoption hearings. This made it easy for Mel and Norma Gabler to block the adoption of textbooks that supported evolution. They simply appeared with a list of complaints that no one was allowed to answer and many of the books they condemned were not adopted. Because Texas is such a large purchaser of textbooks, this encouraged publishers to soft-pedal evolution in order to secure Texas adoption.

What People for the American Way did was encourage Texas state legislators to sponsor bills that would change the laws under which the State

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Board of Education operated. Bills were proposed. To prevent their possible passage, the State Board of Education agreed in January to appoint a 13-member ad hoc committee to review the textbook selection process. On February 5 they held a public hearing on the matter. The hearing lasted eight hours, and fifty people testified on both sides of the question.

Then, on February 11, the State Board of Education ruled that both sides could now be heard in the commenting on textbooks and that rebuttals to complaints would be permitted. This was a major victory. It could easily affect textbook content in the long run and put a crimp on the efforts of the Gablers. However, this action still did not in any way change or remove the Texas Textbook Proclamation which declares that evolution cannot be treated as a "fact" in books adopted by the Board.

Battlefronts around the Nation

Arizona Governor Bruce Babbitt vetoed a bill requiring that the "origin of man" be taught as "theory" in Arizona's public schools. In his April 29 veto message he said the measure was inconsistent with the spirit of the First Amendment to the U.S. Constitution and was an apparent attempt to limit scientific study of evolution. The bill, the only creationist legislation passed in any state this year, did not survive the Governor's veto. There was insufficient support for an override.

A creationist bill was proposed in the Connecticut State Legislature by Democratic Representative Leo H. Flynn in January, but it appears to have died in the Education Committee.

A similar fate befell the creationist bill introduced in the West Virginia State Senate by Senator Homer Heck. The newspaper in the state capital, the Charleston *Gazette* rejoiced in this result with an editorial. The editorial's concluding words were, "Public schools have enough problems without having to cope with religious rules for science classes. The West Virginia Legislature showed good judgment in sticking to the American principle of separation of church and state."

A new "balanced treatment" creationist bill was introduced into the lower house of the Mississippi legislature. Instead of fervid, evangelical debate on the issue, the bill simply died quietly in March. Nonetheless, the bill could come up again next year.

Arkansas Attorney General Steve Clark, the man who defended creationism in the Arkansas case, is suing televangelist Pat Robertson for libel. The suit claims that Robertson, on his "700 Club" religious program, publicly criticized Clark's handling of the creation case. Clark filed his suit as a private citizen. Robertson allegedly told a nationwide audience that Clark's de-

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fense of the creation law was "crooked" and that Clark had "rigged" the trial.

Dr. Gerald R. Bergman, an outspoken creationist, was denied tenure as a professor of education at Ohio's Bowling Green State University. Bergman claims that religious bias was behind the denial and that his civil rights have been violated. However, the Ohio Civil Rights Commission rejected his claim. Undaunted, he has filed suit in Federal court with the help of the Creation Science Legal Defense Fund. Creationists have cited Bergman's case as an example of "persecution" of creationists by the evolution "establishment," an item that they stress in debates. But there just so happen to be cases of professors not getting tenure due to their efforts on the evolution side of the controversy. No names can be mentioned, however, without the permission of those affected. In one such situation, a suit is in progress.

Cases of creationism being quietly taught in public school science classes are starting to come to light in California, Michigan, New York, and Wisconsin. It appears that when creationists fail to pass new legislation, they simply go ahead and teach creationism anyway. These abuses are difficult to ferret out and they reveal a shift in creationist tactics.

Major new battles are beginning to brew in Louisiana, California, and Iowa. Details of these, as more news is received, will be reported in future issues of *Creation/Evolution*.

Brontosaurus in the Congo?

In the Summer of 1981 we reported the planned expedition to Africa by Herman Regusters and others who were seeking out an alleged brontosaurus that was said to be roaming in the jungles. The expedition did take place and, at long last, all the results have been revealed. Here are the details.

Herman Regusters, a consulting engineer at Jet Propulsion Laboratory in Pasadena, California, his wife Kia, cameraman Darby Switzer, and 15 native porters began the expedition in October of 1981. They were airlifted 500 miles inland to an airstrip 90 miles from Lake Tele in the Republic of the Congo. From there they journeyed 50 miles by dugout canoe and then hiked 40 miles through the swamps. It was October 27 before they reached the lake and the area where natives had told missionaries that the monster, called *mokole-mbembe*, had been sighted off and on for the last two centuries.

According to Regusters, two days later they had their first sighting of it. At 6:10 in the morning of October 29 they saw "the head come out of the water, travel for a quarter of a mile and dive." Regusters described the creature as "dark brownish in color, skin appeared slick and smooth, long neck, small head, snakelike." He said the animal was "not identifiable to native hunters, Congolese forest rangers, or us."

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The animal was allegedly seen again on November 1 and 2 when the head and neck emerged from the water. Efforts were made to take photos, but light conditions were poor. In none of the claimed sightings did the animal fully emerge, so its lower body was not visible. This, however, did not keep Regusters from reporting, "Its body is smaller than an elephant and larger than a hippopotamus."

On November 4, the team "heard this horrendous roar, very loud and eerie." That evening the roar was heard again. Regusters reports that a tape recording was made. Later the team tried to see if they could find a footprint, but the area proved too swampy for any impression to have been left.

The team spent a total of six weeks on the expedition before returning, skinny and exhausted. They arrived back in California in late December and had their film taken to the Jet Propulsion Laboratory for careful developing.

The results of the photography were released December 22, 1981, but the tape recording was not released until May 27, 1983. None of the photographs were clear enough to be useful. However, the tape recording was sufficiently audible to make sound analyst Kenith Templin declare, ". . . it is an animal that has not been identified before." But Ian Maddieson in the University of California at Los Angeles linguistics department noted that such analysis, though procedurally sound, "is not very conclusive evidence by itself."

Concerning the whole matter, paleontologist Dr. David Whistler from the Los Angeles County Museum said, "I'm skeptical. It seems hard to believe that an animal that size could escape detection for that long." Paleontologist Dr. William Clemens of the University of California at Berkeley said he wasn't surprised at the discovery of new types of animals. "On the other hand, I'm rather dubious this is a relic from 60 million years ago or more that has existed unchanged in Africa." He argued that hundreds of animals would have had to survive through the ages to ensure the survival of that species.

There doesn't seem to be grounds, then, for the belief that a 35-foot-long brontosaurus, resembling its 80-foot-long counterpart from the age of the great reptiles, is today roaming the jungles of the Congo. Nonetheless, creationists will keep this material in their files, together with claims of plesiosaur sightings off Australia and New Zealand and the latest pictures of the Loch Ness Monster, as evidence that humans and dinosaurs have lived together.

Forget the $100,000

Some of you may recall that in August of 1981, Texas millionaire-industrialist T. Cullen Davis, who was "born again" three years after being acquitted of

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murdering his 12-year-old stepdaughter, offered $100,000 to anyone who could come up with a proof of evolution that could convince him. At that time he declared, "I feel my money is absolutely safe. I invite any professor engaged in teaching evolution to come forward with his evidence. If it turns out to be factually provable, they get the money. I know they can't do it!"

Well, responses were sent in. One was published in the December, 1981 *Civil Liberties* as an open letter. But no one got any money. Finally, over a year later, Mr. David Stokes of Phoenix, Arizona sent in his submission. When he got no reply, he attempted to reach Davis by telephone by calling the Fort Worth offices of Davis's 80-company financial empire, Kendavis Industries. All he got was his secretary, Janie Adams. She declared that Davis had been, in the beginning, answering all responses to his offer. But then he stopped. "We got a lot of goofball responses," she said. "What Mr. Davis offered was the money to anyone who could prove the evolution of the amoeba into man. We got hundreds of responses, but no proof." She explained that the offer still stands and that Davis will pay if evolution is proved to his satisfaction, but she admitted it would be very difficult to prove anything to someone who didn't want to be convinced. Furthermore, she said she wasn't sure what Davis would consider proof.

So if you have plans of going from rags to riches, you might find your odds are better in a state lottery than by trying to collect Mr. Davis's reward.

Committees of Correspondence

The Committees of Correspondence, the local lobbying groups that are combatting creationist efforts at the grass roots level, have now been officially incorporated as the National Center for Science Education. The new name was chosen because the long-range aim of the Committees is to work toward the general improvement of science education in America. Fighting the creationists is just one issue in that overall effort. This is why the need for the Committees will not vanish when the creation-evolution controversy (hopefully) dries up. Stan Weinberg was elected president.

The Committees have been very effective of late. They have disseminated information that allows school officials, speakers, and debaters to counter creationists. They have made their voices heard at local school board meetings. They have monitored creationist activities in various states. And, it appears, they have made creationists painfully aware of their presence. Examples of this latter are the frequent presence of Committee members at creationist public lectures. These members provide valuable information to the audiences when they participate in the question-and-answer periods and ask important scientific and legal questions of the creationist speakers. Their

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effect has gotten so devastating that Henry Morris began a lecture in Georgia recently by stating that it is getting difficult to lecture anywhere these days without being confronted by a Committee of Correspondence.

The effect of the Committees has brought with it a collection of myths that have been repeated in various creationist publications. It is important that these false ideas be laid to rest. Here, then, are the most common charges and the factual answers to them.

MYTH: "The Committees of Correspondence are the local organizations set up by a large consortium of professional societies, universities, and governmental agencies which was organized to fight creationism." (*Acts & Facts*, January 1983.)

FACT: In October 1981 a conference of the executive directors of various science and teachers organizations was held at the National Academy of Sciences in Washington D.C. At that time, the Committees of Correspondence already existed. It was felt that these various organizations should form a unified effort or coalition to combat creationism and support the Committees. Although many valuable personal contacts were made at this meeting, no coalition or organized support ever materialized. As it stands, every existing Committee of Correspondence, without exception, was organized by private individuals of the state or province within which the Committee functions. Some local groups were originally unaware of the Committees when they formed and only later became part of the Committee of Correspondence movement. Prior to the recent incorporation, the Committees were only a loose network of independent local groups working in a common direction. Now, with incorporation, the network will be slightly tighter, but membership of local Committees in the parent corporation is purely voluntary.

MYTH: "The Committees have chosen to work quietly and behind the scenes. . . . Members do not identify themselves to their fellow citizens. . . . the preferred approach is intimidation. . . . they do not favor the democratic process. . . . they feel that parents have no business determining the type of education their children receive." (*Bible-Science Newsletter*, December 1982.) "At the December 5, 1981, Evolution and Public Education seminar held at the University of Minnesota, Stanley Weinberg, one of the organizers of this movement, stated that the Committees preferred, when working in a school district, to work quietly with individual school administrators, so that they could describe creationism to educational leaders without getting creationists involved, and without too much involvement of parents in this part of the educational process." (*Bible-Science Newsletter*, March 1982.)

FACT: Local Committees are very public. They frequently issue news releases, have members speak at local meetings, give interviews to reporters, and occasionally contact local creationist organizers to arrange public debates. Public lobbying is a major activity of the Committees, which can hardly be

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called covert or secretive. As for Stanley Weinberg's statements at the University of Minnesota, he himself can answer best, to wit—

> The facts are: First, I was speaking not of the C/C's but of a different pro-evolution group, a committee of the Iowa Academy of Science. Second, my actual words, from a tape made by the University of Minnesota, were: "What we attempted to do is to present in a temperate way, to a community in difficulty, the sense of the scientific community on the issue. We enter a community or a school district only on invitation. We don't seek to enter into confrontations; our aim is to resolve them, not to provoke them." When the Iowa scientific community consults with local communities, it does not feel obligated to involve, inform, or invite the organized creationists, who represent only themselves, not the community. We have never suggested that we do not welcome consultation and discussion with parents, and with citizens of the local community in general.

Stan Weinberg's description of his actions with the Iowa Academy of Science also describes the actions of some of the local Committees. Often school officials need information on creationism and the Committees provide it so the officials can act in accord with the best scientific knowledge of our time and with the U.S. Constitution.

MYTH: "It becomes quite clear that the Committees are a special interest group intent on changing public opinion on creationism by the censoring of educational materials and the censoring [of] forums which would give citizens the ability to decide the issue for themselves." (*Bible-Science Newsletter*, March 1982.)

FACT: Committees do not "censor" creationist educational materials. School libraries across the nation include these materials at their discretion and the Committees have made no effort to have them removed. However, the use of these materials in public school science classes comprises a significant church-state separation problem due to the sectarian religious nature of so-called "scientific" creationism. Committee members often make it a point to remind school officials of the legal danger they put themselves in by curricular use of these materials. Committees do not "censor" private creationist meetings either. Committee members do not normally show up at those held in churches, and they merely participate in the question-and-answer sessions at those held publicly at colleges and universities. As for creationist meetings held on public school premises under the sponsorship of public school authorities, these are clearly illegal and committee members act to remind school authorities of that fact. When creationists seek to intrude into the public school system, into public museums, or other areas of government, the Com-

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mittees lend their support to the embattled public officials to help insure church-state separation and the integrity of science education.

MYTH: "[The Committees have] one religious group with which they cooperate, the American Humanist Association." (*Bible-Science Newsletter*, March 1982.)

FACT: Numerous Christian, Jewish, and other religious denominations have leaders who are active in the Committees of Correspondence. All Committees are encouraged to work with the local churches in their area. Coalitions of church groups in cooperation with the Committees have been very influential in dealing with school boards. Most church leaders are aware that creationism is merely one brand of Christianity and that it would be unfair to give this one brand special privileges in the public schools as if they were the sole representatives of Christianity. The American Humanist Association, therefore, is merely one of the many philosophical or religious groups that the Committees have found supportive of their efforts. All these groups are involved because they are concerned primarily with church-state separation.

If you are interested in joining the Committee of Correspondence in your state, please write to *Creation/Evolution* for details.

Fun with Polls

Creationists are fond of polling people and coming up with statistics which show that the public wants creationism in the public schools. Two such polls were taken in 1973, one in Del Norte County, California and one in Cupertino, California. The Del Norte poll revealed that 89% of the respondents were pro-creation. The Cupertino poll found that 84.3% of the respondents wanted two-model education. Some time later, the Midwest Center of the Institute for Creation Research conducted a random telephone survey and was able to report that 64% of those called wanted two-model education. These results were reported by Richard Bliss in *ICR Impact Series* No. 60. In 1979, Jerry Bergman published in Vol. 6, No. 2 of *Origins* the results of his survey of university students. His study at Bowling Green State University in Ohio found that 91% of the undergraduate and 71.8% of the graduate students polled favored the two-model approach.

But polls taken in early 1981 showed different results. A *San Francisco Chronicle* phone-in poll found 73% of the respondents *against* the teaching of creationism. A *Detroit Free Press* poll came up with 71% who felt the same way. *The California Poll* showed opinions to be a bit more evenly divided, with 50% favoring the two-model approach and 40% opposed. The details of these polls were published in the "News Briefs" section of *Creation/Evolution* V and elsewhere.

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But then came a rather startling Gallup Poll, also in 1982. It surveyed the nature of creation belief in America and found that 44% agreed that "God created man pretty much in his present form at one time within the last ten thousand years." A total of 47% favored some form of evolution. This was reported in the "News Briefs" of *Creation/Evolution* VI and elsewhere.

But now new light has been thrown on the issue. This last winter the Princeton Religious Research Center reported in *Emerging Trends* the results of its survey that literalist belief has *declined* since 1963 from 65% to 37%. Meanwhile, the percentage of those who think that "the Bible is the inspired word of God, [but] not everything should be taken word for word," increased from 18% to 42%. Those who hold that "the Bible is an ancient book of fables, legends, history and moral precepts, recorded by men," remained stable at 11%.

What does all of this mean? Well, with most of these polls we are comparing apples and oranges. For example, it is unknown how many of those who favor recent creation would also favor two-model education. It is also unknown how many of those who favor recent creation might *not* be biblical literalists. And then there is the problem that some of the survey questions may have been poorly drawn and some of the polls taken unscientifically. Finally, there is the problem that some of the polls were local while others were national. It is thus hard to derive too much meaning from all of this. Nonetheless, these polls can give us rough indications of the mood of our times.

The New Anti-Creationist Books

Normally, books debunking pseudoscience don't sell well, and so are infrequently published. Their poor sales can be attributed to the fact that believers in pseudoscience tend to buy only the books that support their beliefs, while those who reject pseudoscience tend to feel the whole subject is a waste of time and not worthy of any expenditure at all. The exception to this latter case are Christian fundamentalists. They have proven themselves willing to buy books debunking the popular pseudosciences, provided those books do their debunking from a biblical perspective. This accounts for the phenomenal sales of Clifford Wilson's *Crash Go the Chariots*, a book that debunks Von Däniken's *Chariots of the Gods?* from just that angle. It appears that those in the fight against Satan's occult works of darkness want to be armed. The rest of the population, not having such a vested interest, could hardly be concerned.

However, beginning last year, this state of affairs began to change. New books debunking "scientific creationism" began to appear. This is not only

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a rare publishing event, it is a rare event in the annals of science. Seldom will leading scientists and philosophers devote time to researching a pseudoscience so they can educate the public. This time they have. Why?

The answer is simple. Ordinary pseudoscientists usually don't go political, attempt to change school curriculum, sue museums, or try to demand a major share of research grants. Creationists do. And because creationists are so threatening, scientists, teachers, school board members, and parents have become alarmed. This has created a demand for detailed information on creationism and answers to creationist arguments. Publishers are now rushing to meet that demand. To date, fourteen books debunking creationism have been issued by major publishers. They are as follows:

The Monkey Business by Niles Eldredge, Washington Square Press.
Science on Trial: The Case for Evolution by Douglas Futuyma, Pantheon.
Scientists Confront Creationism edited by Laurie Godfrey, W. W. Norton.
Evolution: Genesis and Relations by C. Leon Harris, SUNY Press.
The Neck of the Giraffe: Where Darwin Went Wrong by Francis Hitching, Ticnor & Fields.
Abusing Science: The Case Against Creationism by Philip Kitcher, MIT Press.
Creationism, Science, and the Law: The Arkansas Case by Marcel C. LaFollette, MIT Press.
In the Beginning . . . A Scientist Shows Why the Creationists Are Wrong by Chris McGowan, Macmillan of Canada.
The Creation Controversy: Science or Scripture in the Schools by Dorothy Nelkin, W. W. Norton.
Creation and Evolution: Myth or Reality by Norman D. Newell, Columbia University Press.
Darwinism Defended: A Guide to the Evolution Controversies by Michael Ruse, Addison Wesley.
Did the Devil Make Darwin Do It? edited by David B. Wilson, ISU Press.
Evolution vs. Creationism: The Public Education Controversy, edited by J. Peter Zetterberg, Oryx Press.
Christianity and the Age of the Earth by Davis A. Young, Zondervan.

The two marginal titles are Hitching's *The Neck of the Giraffe* and Young's *Christianity and the Age of the Earth*. The first one tries to take a "neutral" position and disagree with both sides in some things and accept both sides in others. The second is actually written by a creationist who rejects the arguments for a young earth. It was favorably reviewed in *Science*.

With all these new books hitting the market, creationists have taken note. Henry Morris, in his Director's Column in the April, 1983 *Acts & Facts* declared that this proliferation of books was part of "an all-out campaign against the Creator." He further argued that "a whole new scientific sub-

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discipline seems to have 'evolved,' that of professional anti-creationism." Then he turned consumer crusader and started comparing page counts and prices in creationist vs. anti-creationist books. He said that "the sales price per page for an anti-creationist book is about three or four times that for a (completely unsubsidized) creationist book." Why he implied that anti-creationist books are all subsidized is not clear, but it may have to do with the frequent charges that creationists are well bankrolled. Certainly he wanted to counter the charge that creationists are making money from their books. Since Morris is the most prolific creationist writer of them all, perhaps he thought it best to claim that evolutionists, not creationists, were the ones after the almighty dollar. Unfortunately, Morris based his conclusion on evidence as faulty as that for his creationism. He compared the price of a creationist paperback to the prices of two anti-creationist hardcover books—and didn't even tell his readers what he was doing. Recently, one of those two anti-creationist titles came out in paperback—at a price a dollar less than the creationist paperback Morris used for comparison. So much for creationist consumer crusading.

The latest news from ICR is that Henry Morris has just written a book to counter Young's *Christianity and the Age of the Earth*. It is called *Science, Scripture, and the Young Earth*, is 35 pages long, and you can buy three for a dollar. Apparently Young's book, written from a creationist perspective and published by a leading fundamentalist publishing house, is the most threatening of all the new anti-creationist books. This would explain the rapid response by Morris.

Erratum

There was an omission in Andrew J. Petto's article, "The Turtle: Evolutionary Dilemma or Creationist Shell Game?" in *Creation/Evolution* X. Figure 2 was derived from a similar figure published in *Vertebrate Dissection* by W. F. Walker, 1970 (Philadelphia: W. B. Saunders). Therefore, the caption should have credited this source.

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